The fontscale package

A flexible interface for setting font sizes

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1 Introduction

1.1 About

The fontscale package provides the following functionalities:

- Set font sizes using a classic or musical typographic scale.
- Set arbitrary font sizes and font baselineskips for the standard LaTeX font size commands: `\tiny`, `\scriptsize`, `\footnotesize`, `\small`, `\normalsize`, `\large`, `\Large`, `\LARGE`, `\huge`, and `\Huge`.
- Defines lengths that store the current font size, font baselineskip, and the font size of `\normalsize`.
- Set the font size relative to the current font size using more robust tools than the scalefnt and relsize packages.
- Defines expl3 variables that store the font size and font baselineskip of each font size command from `\tiny` to `\Huge` and the current font size and font baselineskip.

1.2 Loading the package

Requirements:

- LaTeX 2_ε version 2023-11-01 or newer
- l3kernel version 2023-11-01 or newer

For historical reasons, the Computer Modern font is available only in a number of discrete font sizes. If you get a warning that Computer Modern is not available in the requested size, you may need to add the following code before `\documentclass` to make Computer Modern available at arbitrary font sizes:

```
\RequirePackage{fix-cm}
```

Alternatively, you can use the Latin Modern font by loading the lmodern package.

When loaded, this package uses `\normalsize` after declaring and initializing the font size commands from `\tiny` to `\Huge`.

Many LaTeX classes have a font size option (e.g. `10pt`, `11pt`, `12pt`) which not only changes the font sizes, but also modifies additional settings such as the page layout and vertical spacing which were specifically designed to work with those font sizes. For this reason, you may want to set the class font size option close to the font size of `\normalsize` set by this package.

1.3 The font size commands from \tiny to \Huge

\tiny
\scriptsize
\footnotesize
\small
\normalsize
\large
\Large
\LARGE
\huge
\Huge
\@currsize

The font size commands from \tiny to \Huge defined by this package:

- First set \@currsize to have the same meaning as the font size command. This is needed only for backwards compatibility.
- Set the font size and font baselineskip using \fontsize and \selectfont. You can change the font sizes and font baselineskips that are set by the font size commands by setting the fontscale package keys (§2). (The font baselineskip should not be confused with the paragraph baselineskip \baselineskip.)
- Cannot be used in math mode.
- Have no other functionality. In particular, they do not change the vertical spacing for displayed math and list structures. This differs from the font size commands defined by many LaTeX classes. You can add arbitrary code to the font size commands using hooks, which are documented in lthooks and ltcmdhooks.

1.4 Syntax

This documentation uses the syntaxes listed below. The syntaxes on the left have the same meaning as the argument to the corresponding command on the right. The commands on the right are documented in usrguide.

syntax	meaning
⟨*number*⟩	\fpeval
⟨*integer*⟩	\inteval
⟨*dimen*⟩	\dimeval
⟨*skip*⟩	\skipeval

2 Keys

This section documents the keys provided by the fontscale package. Set the package keys using \fontscalesetup (§3.1).

2.1 The key typographic-scale

The font sizes of the font size commands from \tiny to \Huge are initially set by the key typographic-scale.

typographic-scale

typographic-scale = classic|musical

Choice key that sets the font size of each font size command from \tiny to \Huge using a classic or musical typographic scale. These are common methods of choosing a set of document font sizes. The initial value is classic.

classic
musical

Meta keys that set the key typographic-scale to the named value.

Table 1: The font size of each font size command from `\tiny` to `\Huge` when setting the key `typographic-scale = classic` with different values for the key `classic/base`. The font sizes are in units of points. The "point" used depends on the value of the key `classic/point`.

font size command	`10`	`11`	`12`
`\tiny`	6	7	8
`\scriptsize`	7	8	9
`\footnotesize`	8	9	10
`\small`	9	10	11
`\normalsize`	10	11	12
`\large`	11	12	14
`\Large`	12	14	16
`\LARGE`	14	16	18
`\huge`	16	18	21
`\Huge`	18	21	24

2.1.1 The classic typographic scale

`classic/base` `classic/base = 10|11|12`
`classic/point` `classic/point = pt|bp|dd|nd`

Setting the key `typographic-scale = classic` sets the font size of each font size command from `\tiny` to `\Huge` using the classic typographic scale. The classic typographic scale consists of the traditional font sizes in units of points:[1]

a a a a a a a a a a a a a a a a a a
6 7 8 9 10 11 12 14 16 18 21 24 30 36 48 60 72

They have been used since the sixteenth century and are the default font sizes on some computer software.

The choice key `classic/base` sets the base font size of the classic typographic scale to the named value in units of points. The base font size is the font size of `\normalsize`. The font sizes of the other font size commands are the adjacent font sizes in the classic typographic scale in units of points. The initial value is `10`. The choice key `classic/point` sets which "point" is used. The initial value is `pt`. Table 1 displays the font size of each font size command from `\tiny` to `\Huge` when setting the key `typographic-scale = classic`.

1. See *The Elements of Typographic Style* by Robert Bringhurst.

Table 2: The font size of each font size command from `\tiny` to `\Huge` when setting the keys `typographic-scale = musical`, `musical/ratio = 2`, and `musical/notes = 5` with different values for the key `musical/base`. The font sizes are in units of pt and rounded to 2 decimal places.

font size command	i	10 pt	11 pt	12 pt
`\tiny`	−4	5.74	6.32	6.89
`\scriptsize`	−3	6.60	7.26	7.92
`\footnotesize`	−2	7.58	8.34	9.09
`\small`	−1	8.71	9.58	10.45
`\normalsize`	0	10	11	12
`\large`	1	11.49	12.64	13.78
`\Large`	2	13.20	14.51	15.83
`\LARGE`	3	15.16	16.67	18.19
`\huge`	4	17.41	19.15	20.89
`\Huge`	5	20	22	24

2.1.2 The musical typographic scale

`musical/base` `musical/base = ⟨dimen⟩`
`musical/ratio` `musical/ratio = ⟨number⟩`
`musical/notes` `musical/notes = ⟨integer⟩`

Setting the key `typographic-scale = musical` calculates the font size of each font size command from `\tiny` to `\Huge` using the formula for the musical typographic scale:[2]

$$f_i = f_0 \times r^{i/n}$$

f_i is the font size of the ith note. f_0 is the base font size. n is the number of notes, the number of font sizes above f_0. r is the musical ratio, the ratio of the highest to the lowest note f_n/f_0.

The key `musical/base` sets the base font size f_0 to ⟨*dimen*⟩. The base font size is the font size of `\normalsize`. The initial value is 10 pt. The key `musical/ratio` sets the musical ratio r to ⟨*number*⟩. The initial value is 2. The key `musical/notes` sets the number of notes n to ⟨*integer*⟩. The initial value is 5. Table 2 displays the font size of each font size command from `\tiny` to `\Huge` when setting the key `typographic-scale = musical`.

2.2 The key `baselineskip-size-ratio`

The font baselineskips of the font size commands from `\tiny` to `\Huge` are initially set by the key `baselineskip-size-ratio`.

2. I have referenced this article by Spencer Mortensen:
`https://spencermortensen.com/articles/typographic-scale/`

`baselineskip-size-ratio` `baselineskip-size-ratio = ⟨number⟩`

Sets the font baselineskip of each font size command from `\tiny` to `\Huge` equal to its font size × ⟨*number*⟩. The initial value is 1.2. This key also affects the behavior of `\setfontsize` (§3.3).

2.3 Overwriting the previous keys

This subsection documents keys for setting the font sizes and font baselineskips of the font size commands from `\tiny` to `\Huge` in a more direct manner.

When setting the font sizes, you should take care to ensure that their lengths remain correctly ordered from `\tiny` to `\Huge`. This is important for typographic and syntactic consistency. If the font sizes are in the wrong order, then `\fontscalesetup` will issue a warning and some package features may not work correctly.

`tiny/size-normalsize-ratio`
`scriptsize/size-normalsize-ratio`
`footnotesize/size-normalsize-ratio`
`small/size-normalsize-ratio`
`large/size-normalsize-ratio`
`Large/size-normalsize-ratio`
`LARGE/size-normalsize-ratio`
`huge/size-normalsize-ratio`
`Huge/size-normalsize-ratio`

⟨*font size command*⟩`/size-normalsize-ratio = ⟨`*number*⟩

Sets the font size of `\`⟨*font size command*⟩ equal to the font size of `\normalsize` × ⟨*number*⟩. Overwrites the font size set by the key `typographic-scale`. The initial value is ⟨*not set*⟩. The key `normalsize/size-normalsize-ratio` is not defined.

`tiny/size`
`scriptsize/size`
`footnotesize/size`
`small/size`
`normalsize/size`
`large/size`
`Large/size`
`LARGE/size`
`huge/size`
`Huge/size`

⟨*font size command*⟩`/size = ⟨`*dimen*⟩

Sets the font size of `\`⟨*font size command*⟩ to ⟨*dimen*⟩. Overwrites the font size set by the keys `typographic-scale` and ⟨*font size command*⟩`/size-normalsize-ratio`. The initial value is ⟨*not set*⟩.

`tiny`
`scriptsize`
`footnotesize`
`small`
`normalsize`
`large`
`Large`
`LARGE`
`huge`
`Huge`

⟨*font size command*⟩ `= ⟨`*dimen*⟩

Meta keys that set the key ⟨*font size command*⟩`/size` = ⟨*dimen*⟩.

tiny/baselineskip-size-ratio
scriptsize/baselineskip-size-ratio
footnotesize/baselineskip-size-ratio
small/baselineskip-size-ratio
normalsize/baselineskip-size-ratio
large/baselineskip-size-ratio
Large/baselineskip-size-ratio
LARGE/baselineskip-size-ratio
huge/baselineskip-size-ratio
Huge/baselineskip-size-ratio

⟨*font size command*⟩/baselineskip-size-ratio = ⟨*number*⟩

Sets the font baselineskip of \⟨*font size command*⟩ equal to its font size × ⟨*number*⟩. Overwrites the font baselineskip set by the key baselineskip-size-ratio. The initial value is ⟨*not set*⟩.

tiny/baselineskip
scriptsize/baselineskip
footnotesize/baselineskip
small/baselineskip
normalsize/baselineskip
large/baselineskip
Large/baselineskip
LARGE/baselineskip
huge/baselineskip
Huge/baselineskip

⟨*font size command*⟩/baselineskip = ⟨*skip*⟩

Sets the font baselineskip of \⟨*font size command*⟩ to ⟨*skip*⟩. Overwrites the font baselineskip set by the keys baselineskip-size-ratio and ⟨*font size command*⟩/baselineskip-size-ratio. The initial value is ⟨*not set*⟩.

3 Commands

This section documents the commands provided by the fontscale package.

3.1 Setting the keys

\fontscalesetup

\fontscalesetup ⟨*⟩ {⟨*key-value list*⟩}

Sets and processes the fontscale package keys (§2) in ⟨*key-value list*⟩ and then uses \normalsize. Adding the optional star first sets all the fontscale package keys to their initial values. All assignments made by \fontscalesetup are local to the current group. Can be used mid-document. Cannot be used in math mode.

3.2 Lengths

\currentfontsize

Dimen register (rigid length) that stores the current font size. This is more convenient than using \f@size.

\currentfontbaselineskip

Skip register (rubber length) that stores the current font baselineskip. This is more convenient than using \f@baselineskip. (The font baselineskip should not be confused with the paragraph baselineskip \baselineskip.)

\currentnormalsize

Dimen register (rigid length) that stores the current font size of \normalsize.

3.3 More font size commands

\setfontsize `\setfontsize [⟨skip⟩] {⟨dimen⟩}`

Sets the font size to ⟨*dimen*⟩. Sets the font baselineskip to ⟨*skip*⟩ or, if the optional argument is omitted, equal to the new font size × the value of the key `baselineskip-size-ratio` (§2.2). Cannot be used in math mode. This command is a more robust alternative to `\fontsize` + `\selectfont`.

\stepfontsize `\stepfontsize {⟨integer⟩}`

Increases the font size by an ⟨*integer*⟩ number of "steps". Changing the font size by one step means incrementing/decrementing from a font size equal to the font size of a font size command from `\tiny` to `\Huge` to the next larger/smaller \⟨*font size command*⟩ by using \⟨*font size command*⟩. Changing the font size by more than one step does not use any intermediate \⟨*font size command*⟩. If ⟨*integer*⟩ = 0 and the current font size equals the font size of any \⟨*font size command*⟩, then `\stepfontsize` uses \⟨*font size command*⟩.

Some exceptions:

- Issues a warning if the current font size does not equal the font size of any font size command from `\tiny` to `\Huge`.
- Issues an error if the font size would be changed by more than nine steps.
- Issues a warning and uses `\tiny` if the new font size would be smaller than `\tiny`.
- Issues a warning and uses `\Huge` if the new font size would be larger than `\Huge`.
- Cannot be used in math mode.

3.4 Setting only the font baselineskip

\setfontbaselineskip `\setfontbaselineskip {⟨skip⟩}`

Sets the font baselineskip to ⟨*skip*⟩. Does not change the font size. Cannot be used in math mode.

3.5 Printing sample text

\printsampletext `\printsampletext ⟨*⟩ {⟨text⟩}`

Prints ⟨*text*⟩ in each font size ordered from `\tiny` to `\Huge` each followed by `\par`. ⟨*text*⟩ can contain `\par` tokens. Adding the optional star reverses the order of the font sizes.

\printfontsizecommand Prints \⟨*font size command*⟩ if the current font size equals the font size of any font size command from `\tiny` to `\Huge`. Otherwise, prints "`\undefined`". The command name is printed in `\ttfamily`.

4 Programming

This section documents the expl3 programming support provided by the fontscale package.

4.1 Compatibility with `\text_purify:n`

This package uses `\text_declare_purify_equivalent:Mn` to make `\text_purify:n` correctly remove the text formatting commands defined by this package.

4.2 Variables set by `\fontscalesetup`

`\l_fontscale_tiny_size_dim`
`\l_fontscale_scriptsize_size_dim`
`\l_fontscale_footnotesize_size_dim`
`\l_fontscale_small_size_dim`
`\l_fontscale_normalsize_size_dim`
`\l_fontscale_large_size_dim`
`\l_fontscale_Large_size_dim`
`\l_fontscale_LARGE_size_dim`
`\l_fontscale_huge_size_dim`
`\l_fontscale_Huge_size_dim`
`\l_fontscale_⟨font size command⟩_size_dim`

Stores the font size of `\⟨font size command⟩`. `\l_fontscale_normalsize_size_dim` is equivalent to `\currentnormalsize` (§3.2).

`\l_fontscale_tiny_baselineskip_skip`
`\l_fontscale_scriptsize_baselineskip_skip`
`\l_fontscale_footnotesize_baselineskip_skip`
`\l_fontscale_small_baselineskip_skip`
`\l_fontscale_normalsize_baselineskip_skip`
`\l_fontscale_large_baselineskip_skip`
`\l_fontscale_Large_baselineskip_skip`
`\l_fontscale_LARGE_baselineskip_skip`
`\l_fontscale_huge_baselineskip_skip`
`\l_fontscale_Huge_baselineskip_skip`
`\l_fontscale_⟨font size command⟩_baselineskip_skip`

Stores the font baselineskip of `\⟨font size command⟩`.

4.3 Variables set in the `selectfont` hook

`\l_fontscale_size_dim` Stores the current font size. Equivalent to `\currentfontsize` (§3.2).

`\l_fontscale_baselineskip_skip`

Stores the current font baselineskip. Equivalent to `\currentfontbaselineskip` (§3.2).